

CLAIMS

1 1. A process for forming a preform for use in a composite structure having
2 at least one curved portion of a specific length, the process comprising the
3 steps of:

4 providing a preform capable of expanding the length of the threads in
5 rows parallel to the direction of curvature over a length equal to the length
6 requiring curvature, and

7 stretching the portions of the preform requiring curvature in a sine-
8 wave pattern.

1 2. The process as set forth in claim 1 wherein the preform is made of
2 woven material.

1 3. The process as set forth in claim 2 wherein the step of providing a
2 preform capable of expanding the length of the threads in rows parallel to the
3 direction of curvature over a length equal to the length requiring curvature
4 includes the step of forming the preform with discontinuous threads in rows
5 parallel to the direction of curvature over a length equal to the length
6 requiring curvature, such that the gaps between each thread row are spaced
7 from the gaps in the adjacent tread rows.

1 4. The process as set forth in claim 2 wherein the step of providing a
2 preform capable of expanding the length of the threads in rows parallel to the
3 direction of curvature over a length equal to the length requiring curvature,
4 such that the gaps between each thread row are spaced from the gaps in the
5 adjacent tread rows includes the steps of:

6 providing a preform having continuous threads; and

7 cutting the treads parallel to the direction of curvature into over a
8 length equal to the length of the length requiring curvature, such that the cuts
9 in each thread are spaced from the cuts in the adjacent treads.

1 5. The process as set forth in claim 1, or 2, or 3, or 4, wherein the step of
2 step of stretching the portions of the preform requiring curvature in a sine-
3 wave pattern includes forming is accomplished in a sine wave shaped die.

1 6. The process of claim 5 wherein the preform is a 3D woven PI shaped
2 cross-section preform having first and second foot portions and first and
3 second upstanding leg portions for use in a structure having at least one
4 curved portion of a specific length.

1 7. A process for forming a 3D woven PI shaped cross-section preform
2 having a first and second foot portions and first and second upstanding leg
3 portions for use in a structure having at least one curved portion of a specific
4 length, the process comprising the steps of:

5 cutting the treads parallel to the direction of curvature into over a length
6 equal to the length, such that the cuts in each thread are spaced from the cuts
7 in the adjacent treads;

8 stretching the portions of the preform requiring curvature.

1 8. The process as set forth in claim 7 comprising the step of forming the
2 curvature in the preform.

1 9. The process as set forth in claim 8 including the step of impregnating
2 the preform prior to the step of cutting the treads parallel to the direction of
3 curvature into over a length equal to the length, such that the cuts in each
4 thread are spaced from the cuts in the adjacent treads.

1 10. The process as set forth in claim 9 wherein the step of stretching the
2 portions of the preform requiring curvature is accomplished by forming a
3 sine-wave pattern in the portions of the preform requiring curvature.

1 11. The process as set forth in claim or 7, or 8, or 9, or 10, wherein prior
2 to the step of cutting the treads parallel to the direction of curvature into over
3 a length equal to the length, such that the cuts in each thread are spaced
4 from the cuts in the adjacent treads, the step of folding the first and second
5 upstanding leg portions over the first and second bottom foot portions.